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# The General Determinants of Share Returns: An Empirical Investigation on the Dhaka Stock Exchange

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This paper investigates the underlying factors that determine share returns on the Dhaka Stock Exchange. The empirical analysis does not support the critical condition of the Capital Asset Pricing Model of a positive relationship between share return and beta. However, it shows that variables such as size, price to book, volume of shares traded, earnings yield and cash flow yield have a significant influence on share returns. The degree and direction of relationship among the variables are similar to other emerging markets, but are not always consistent with developed markets perhaps due to lack of homogeneous expectations regarding risk return characteristics and different market microstructure.

*Keywords:* CAPM; emerging market; anomalous factors; multi-factor model.

JEL Classification: G12

## 1. Introduction

The performance of stock market pricing mechanisms is an important factor for channelling savings into profitable investment and ensuring an optimal allocation of capital. The classic Capital Asset Pricing Model (CAPM)

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theoretically implies that when a market is efficient, the only determinant of share return is the systematic risk. However, Amanulla and Kamaiah (1998) show that stock return variation may be influenced by many other potential factors such as the presence of derivative securities, dividends and uncertain inflation. In addition, fundamental approaches for stock analysis suggest that there are accounting variables that help to determine the value of any security. Further, there are other factors important to the shareholders, managers, investors, and other capital market participants. These factors may be external macroeconomic influences or internal (e.g., firm-specific factors, market factors and specific industry factors etc.).

This study provides evidence on the general determinants of share returns on the Dhaka Stock Exchange (DSE). The results suggest that some variables such as size, volume, cash flow yield and earnings yield have a significant influence on share returns. The results are similar to other emerging markets, but are not always consistent with developed markets, perhaps, due to the lack of homogeneous expectations regarding risk return characteristics and different market microstructure.

## 2. Review of Previous Empirical Evidence

Cross-sectional assets return has been widely tested in the finance literature resulting in serious challenges to the adequacy of the CAPM as a representation of capital market equilibrium (for example, Basu, 1977; Banz, 1981; Reinganum, 1981 and Bhandari, 1988). The possibility that beta is not the only measure of risk is suggested in a number of theoretical and empirical papers (e.g., Ross, 1976; Chan *et al.*, 1991 and Fama and French, 1992). Several studies show that deviations from the linear CAPM risk-return trade-off are related to other variables such as the firm size (Banz, 1981), earnings yield (Basu, 1977, 1983), leverage (Bhandari, 1988), the firm's book-value-to-equity ratio (Stattman, 1980; Rosenberg *et al.*, 1985 and Chan *et al.*, 1991), dividend yield (Black and Scholes, 1974; Litzenberger and Ramaswamy, 1979 and Chu, 1997), cash flow yield (Chan *et al.*, 1991 and Davis, 1994), historical sales growth (Davis, 1994 and Lakonishok *et al.*, 1994), industrial structure (Roll, 1992) and volume (Lakonishok and Smidt, 1989 and Amihud and Mendelson, 1991). These factors are typically referred to as anomalous and are still debatable in the finance community since they are not well specified in theory.

Hetson *et al.* (1995) show that international equity markets share multiple factors. Furthermore, they find more common risk factors among

securities within a country than across countries, which reflects in part the economic specialization of countries into certain industries as emphasized by Roll (1992). Cochrane (2000) summarizes the revolution of a multi-factor world, where there are other strategies that result in high average returns without large betas. Emerging stock markets are interesting fields to test whether anomalous pricing factors are related to a common behaviour of investors across all financial markets. Results which support the existence of these premia come from Fama and French (1998); Rouwenhorst (1998) and Claessens *et al.* (1996) showing that lower liquidity is not sufficient to explain the out performance of small versus large, and low-market-to-book versus high market-to-book-stocks in these markets.

The DSE is likely to be a representative of an emerging market during the period with rapid growth in terms of market capitalization, trade volume and the number of listed companies. In Bangladesh, the pace of industrialization has suffered in the past due factors such as: agriculture-based country, lack of entrepreneurs, low level of productivity, and lack of discipline in the financial sector. However, the pattern of predictability of returns, the perception of risk return preferences prevailing on the DSE and the other countries may vary due to different market microstructure and behaviour of the investors. For instance, the return generation factors to which investors are exposed to may differ among countries due to the ownership structure, breadth and depth of capital markets, dividend policies and firms' accessibility to external finance, which also depends how well the investors (both shareholders and creditors) are protected by law from expropriation by the managers and controlling shareholders of firms (see, for example, La Porta *et al.*, 2000). The lack of research in a less developed market like Bangladeshi Stock Market, where the stock exchange has largely developed after 1980s, the structure, functioning, efficiency are the research questions, which need to be addressed. This study is a first attempt to explore the return generation factors on the DSE. It is expected that the factors having a significant influence on share return in developed markets might differ from those in less developed markets because of investors' different behavioural attitudes or due to the influence of different risk factors in those markets. However, there are few studies available in the emerging markets that examine whether risk factors are consistent with developed markets. This study seeks evidence on whether factors such as size, price-to-book value, earnings yield, dividend yield, cash flow yield, volume and sector dummies are significantly related to stock returns.

### 3. Sample and Methodology

This study includes 123 non-financial companies listed on the DSE. Financial companies (such as bank, investment and insurance companies) are excluded (like Fama and French, 1992) because the high leverage that is normal for financial companies probably does not mean the same for non-financial companies. Moreover, the record-keeping system is not uniform among the companies. The sample period for the study includes the period from 1988 to 1997. As an emerging market, the DSE flourished its activities during the sample period in terms of number of securities listed, volume of transactions and the trading procedure (e.g., automation, introduction of Central Depository System etc.).

These are the main considerations in selecting this particular sample period. The study does not consider the companies, which are not traded for any one of the sample periods during 1988 to 1997 resulting in thirty companies being excluded from the sample. Fourteen companies, which have missing data, are also excluded from the sample. The study requires share price data, volume data and accounting data for each individual company. The daily share prices of individual companies and volume of shares traded are mainly collected from the Data Stream for the period of 1993 to 1997. Data not available on Data Stream for the sample period of 1988 to 1992 are collected from the daily price quotations officially published by the DSE. The individual company's accounting data (such as sales, net profit after tax, operating income, number of common stock, shareholder's equity, total debt, total assets and dividends paid) are collected from the annual reports of the companies.

The general model is a two-stage procedure that considers both time-series and cross-sectional regression models. In the first stage, betas of individual securities are calculated from the time-series regression model. In the second stage, average cross-sectional regressions are run. In addition, to examine the time effect, pooled regression models with year dummies are also employed. We run regressions on annual data due to availability of accounting data only on annual basis. The advantages of the approach can be pointed out as follows. First, the beta is adjusted, including the lag and lead values (Dimson, 1979) that reduce the bias of thin trading. This approach also reduces the errors-in-variable problems bias through the averaging process that it entails (see, for example, Mairesse, 1993). Second, the study considers individual firms instead of portfolios. The use of individual assets ensures the full utilization of information about the cross-sectional behaviour of individual stocks that might otherwise be lost in forming portfolios (Kim,

1997). It also avoids the data-snooping bias (Lo and Mackinlay, 1990) and avoids arbitrariness associated with the portfolio-formation method (e.g., varying the number of portfolios used in the cross-sectional regression estimation can result in different risk premia (see, for example, Fama and French, 1992 and Kothari *et al.*, 1995). Third, the averaging process can easily handle unbalanced panel data as found in the emerging market where the number of companies listed varies from year to year. Finally, the study includes the year dummy in the pooled models that shows the time effect of the relationship between beta and share returns. This study estimates the analyses over a period of ten years from 1988 to 1997. To confirm and compare the results, sub-period analyses are also run. In order to examine the variation and consistency among different periods, the full sample period is divided into three panels.

### 3.1. *The average cross-section model*

*Model A*

$$\begin{aligned}
 LNSHRET_i = & \alpha_0 + \alpha_1 \beta_i + \alpha_2 Size_i + \alpha_3 PBV_i + \alpha_4 Volume_i \\
 & + \alpha_5 DIVY_i + \alpha_6 EPPOS_i + \alpha_7 EPNEG_i + \alpha_8 CFPOS_i \\
 & + \alpha_9 CFNEG_i + \alpha_{10} LEVER_i + \alpha_{11} Growth_i \\
 & + INDUM_{2-5} + e_i
 \end{aligned} \tag{1}$$

where, Log of share return =  $f$  (beta, size, ratio of price-to-book value, volume, dividend yield, positive earnings yield, negative earnings yield, positive cash flow yield, negative cash flow yield, leverage, growth and industry dummy).

### 3.2. *The pooled model*

*Model B*

$$\begin{aligned}
 LNSHRET_{it} = & \alpha_0 + \alpha_1 \beta_{it} + \alpha_2 Size_{it} + \alpha_3 PBV_{it} + \alpha_4 Volume_{it} \\
 & + \alpha_5 DIVY_{it} + \alpha_6 EPPOS_{it} + \alpha_{7t} EPNEG_{it} \\
 & + \alpha_8 CFPOS_{it} + \alpha_9 CFNEG_{it} + \alpha_{10} LEVER_{it} \\
 & + \alpha_{11} Growth_{it} + INDUM_{2-5} + e_{it}
 \end{aligned} \tag{2}$$

where, Log of share return =  $f$  (beta, size, price-to-book value, volume, dividend yield, positive earnings yield, negative earnings yield, positive cash flow yield, negative cash flow yield, leverage, growth and industry dummy, year dummy).

The variables are chosen from those variables that are shown to have an explanatory power with respect to returns. According to developed market findings, it is evident that there is a significant negative relationship between shares return and size (e.g., Banz, 1981; Chan *et al.*, 1991 and Fama and French, 1992) because the small firms are more riskier than the large firms. However, later research in the emerging and less developed markets shows evidence that there is a positive relationship between size and share return (e.g., Prera, 1995 and Claessens *et al.*, 1996). In general, there is a significant positive relationship between the book-to-market ratio and stock returns in developed markets (Chan *et al.*, 1991; Fama and French, 1992; Lakonishok *et al.*, 1994 and Davis, 1994). However, in the emerging market research, Claessens *et al.* (1996) found a significant positive relationship between the price-to-book value and share returns in many of those markets.

It is usually found that there is a positive relationship between earnings yield and stock returns (Basu, 1977, 1983 and Cook and Rozeff, 1984). In calculating the effect of both positive and negative earnings yield, this study follows the general strategy that has been used by Fama and French (1992) and Davis (1994). The shortcomings of accounting earnings have motivated a number of recent papers to explore the relationship between cash flow yield and share return. Usually, there is a significant positive relationship between cash flow yield and stock returns (Chan *et al.*, 1991; Davis, 1994 and Chu, 1997). In Bangladesh, most of the companies follow the straight-line depreciation method. It is, therefore, interesting to know whether cash flow yield (both positive and negative) has any significant effect on share return on the DSE. In developed markets, volume has both negative and positive effects on share return (Jennings *et al.*, 1981 and Lakonishok and Smidt, 1989). This study uses the log of volume of shares traded as an independent variable. In Bangladesh, insiders hold about 30% of shares, which indicates that they may have a major influence on the market because they are the major shareholders in the market. This is a major cause of a higher level of information asymmetry in the market. When the insiders purchase or sell a large volume of their shares, the uninformed investors also start buying or selling because they think that insiders have private information that causes an increase or decrease in price. Moreover, because of lack of close substitutes and limited arbitrage in the market, it is expected that the relationship between volume of shares traded and stock returns on the DSE would be different.

The effect of dividend yield on stock return is, generally, found to be positive, (e.g., Black and Scholes, 1974 and Litzenberger and Ramaswamy, 1979, 1982). However, research in emerging markets documents that the

relationship between share returns and dividend yield might be positive or negative (see, for example, Claessens *et al.*, 1996). The dividend yield is calculated as the deflated value of annual cash-dividend and market value of individual company. This study considers only the cash dividend because the stock dividend practice on the DSE is very rare. Leverage, which is also a significant factor, has a positive influence on stock returns in developed markets (Bhandari, 1988). This study includes debt-equity as an additional variable and as a proxy for the risk of common equity. Hence, debt-equity may be a proxy for risk when beta is an inadequate measure of risk. Recently, growth is also considered as an explanatory variable. In the US market, Lakonishok *et al.* (1994) find a significant negative relationship whereas Davis (1994) finds a negative but insignificant relationship between share return and growth. On the contrary, Allen and Rachim (1996) document a positive significant relationship between price volatility and growth in the Australian market. In this study, the change of total annual assets is considered as a proxy of the annual growth to see whether it has any significant influence on share returns on the DSE.

From the prior empirical evidence, it is documented that industrial sector differences have an impact on market indices, (e.g., King, 1966 and Roll, 1992). This study aggregates total industries into five major sectors where, sector 1 represents the Food and Allied sector; sector 2 represents the Engineering sector; sector 3 represents Jute and Textile sectors, sector 4 represents Pharmaceuticals and Chemicals sectors, sector 5 represents the other mix of products in the Miscellaneous category.

#### 4. Empirical Results and Discussions

Table 1 exhibits the summary statistics of all the variables. The mean share return (after transforming log) is 0.004% and the mean beta is 0.503. The average size of the company during the period is 2.16 (in million); the average volume of shares traded is 758.578 unit. The average dividend yield is 6.1% and the average growth rate is 13.22% during the whole sample period. The average ratio of price-to-book value is 1.44. The mean of positive earnings yield is 29.43% while the average negative earning yield is 18.33%. The average of positive and negative cash flow yield is 25.54% and 16.97% respectively.

Correlation analysis is run to examine the causation and direction of relationship. The results of Pearson (2-tailed) correlation matrix presented in Table 2 show that there is a low degree of negative correlation ( $-0.066$ )

Table 1. Summary statistics of variables.

Variables	Minimum	Maximum	Mean	Standard Deviation
LNSHRET	-0.01	0.04	0.0000355	0.0032
BETA	-1.63	3.29	0.5025	0.6213
Size	0.01	4.20	2.157	0.6385
PBV	-0.94	11.76	1.4416	1.491
VOLUME	0.61	6.07	2.877	0.8616
EPPOS	0.00	2.94	0.2943	0.4407
EPNEG	0.00	1.00	0.1833	0.3872
CFPOS	0.00	3.74	0.2554	0.4276
CFNEG	0.00	1.00	0.1697	0.3756
DIVY	0.00	2.37	0.061	0.1760
LEVERAGE	0.00	5.73	0.2390	0.3078
GROWTH	-0.38	1.92	0.1322	0.2780

*Note:* LnSHRET = (log of share return) LN [(Pt + Dt)/Pt - 1] where, P is the price per share and D is the dividend per share, Beta ( $\beta$ ) is calculated based on Dimson (1979) correction model where aggregate beta of individual company is calculated as follows:  $\beta_i = (\beta_{i-1} + \beta_{i0} + \beta_{i+1})$ ; Size = log of Sales (Units in taka/Bangladeshi currency); PBV = SPPS/BVPS; where BVPS = equity/no. of common stock; SPPS = share price per share, (EY = EPS/SPPS) EPS = operating income/NOCS; NOCS = number of common stocks, SPPS = share price per share. When earnings yield is positive EPPOS = earnings yield (value) and 0 for otherwise; EPNEG = 0 when Earnings yield is positive and 1 when negative, DIVY = DIV/MV; DIV = annual cash dividend and MV = annual market value, Cash flow = NPAT + DEP, NPAT = net profit after tax and DEP = depreciation, CFPS = cash flow/SPPS, CFY = cash flow per share/share price per share; CFPOS = cash flow yield (value) if cash flow yield is positive and 0 for otherwise; CGNEG = 0 for positive value and 1 for negative values of CFY; Volume = log transformation of raw volume data; Leverage = total long term debt/total equity; Growth = change of annual total assets.

between beta and share return significant at 10% level. On the other hand, there is a significant positive correlation (0.078) between the size and share return significant at 5% level. There is also a positive correlation between share return and the ratio of price-to-book value (0.109) significant at 1% level. On the other hand, there is a negative correlation (-0.065) found between negative earnings yield and share return at 10% level of significance. Similarly, there is a negative correlation (-0.10) between negative cash flow yield and share return significant at 1% level. Results from the correlation matrix also suggest that the variables earnings yield and cash flow yield are correlated (0.640 for positive and 0.621 for negative yield). As noted in the



Table 2. Correlation matrix of the variables.

	LNSHRT	BETA	SIZE	PBV	DIVY	VOLUME	EPPOS	EPNEG	CFPOS	CFNEG	LEVER	GROWTH
LN	1.00	-0.064°	0.078*	0.109**	-0.016	0.049	0.060	-0.065°	-0.035	-0.100**	0.022	0.046
SH	-0.064°	1.00	0.194**	0.188**	0.056	0.142**	-0.080*	-0.099*	-0.013	-0.103**	0.022	0.088*
SIZE	0.078*	0.194**	1.00	0.165**	0.186**	-0.213**	0.167**	-0.26**	0.17**	-0.357**	-0.175**	0.051
PBV	0.109**	0.188**	0.165**	1.00	-0.009	-0.204**	-0.214**	-0.21**	-0.24**	-0.198**	-0.066	0.061
DIVY	-0.016	0.056	0.186**	-0.009	1.00	0.166**	0.066	-0.139**	0.189**	-0.151**	-0.011	0.024
VOLUME	0.049	0.142**	-0.213**	-0.20**	0.166**	1.00	0.061	0.134**	0.114**	0.160**	0.048	-0.028
EPPOS	0.060	-0.080*	0.167**	-0.21**	0.066	1.00	0.066	-0.31**	0.64**	-0.180**	-0.077*	-0.035
EPNEG	-0.065°	-0.099*	-0.26**	-0.21**	1.00	-0.139**	1.00	-0.16**	0.621**	0.142**	-0.137**	-0.137**
CFPOS	-0.035	-0.013	0.17**	-0.24**	1.00	0.189**	0.64**	1.00	-0.27**	-0.042	-0.040	-0.040
CFNEG	-0.100**	-0.103**	-0.357**	-0.198**	-0.139**	-0.151**	-0.18**	0.62**	1.00	0.137**	1.00	-0.132**
LEVER	0.022	0.022	-0.175**	-0.066	-0.011	-0.077*	-0.077*	0.142**	-0.042	0.137**	1.00	-0.094*
GROWTH	0.046	0.088*	0.051	0.061	0.024	0.024	-0.035	-0.137**	-0.040	-0.132**	-0.094*	1.00

° denotes significant at 10% level; \*\* denotes significant at 1% level; \* denotes significant at 5% level.

previous section, the interaction effect among the explanatory variables are likely, which are the scale versions of share prices. So, the correlation that is found between cash flow yield and earning yield is not unexpected.

Table 3 presents the results of the average cross-sectional regression models for the full sample period. The results suggest that the intercept of the regression is significantly different from zero at odds with the CAPM. The more striking result is the significant negative relationship between beta and share return. The finding is not surprising as the review of prior empirical studies in non-US markets also shows a negative significant relationship between beta and share return (e.g., Claessens *et al.*, 1996 and Bryant and Eleswarapu, 1997). The findings are similar to the findings by Fama and French (1992) in the US market.

The empirical evidence from the average cross-sectional regression model also documents that there is a significant positive relationship between share return and other explanatory variables such as size, price-to-book value ratio and volume of shares traded. The relationship between positive earnings yield and share return barely misses traditional significant levels with a  $t$ -value of 1.5. On the other hand, there is a significant negative relationship found between share return and dividend yield as well as with the negative cash flow yield. In addition, the industry dummies also have a positive significant influence on share return for the Engineering and Pharmaceuticals and Chemicals sectors.

The results of the pooled regression model (presented in Table 3) show that most of the year dummies are significant. The significant year dummy clearly indicates that there is a significant time effect on the relationship among the variables. However, the pooled regression analysis improves the model summary. The adjusted  $R^2$  increased to 56.9% implies that the model can explain the 56.9% variation of annual share return during the period 1988 to 1997. However, the results of the pooled model during the period suggest that there is a significant negative beta effect on share return as found on the average cross-sectional regression model. The size effect is also consistent with the average cross-sectional model which states that there is a positive significant relationship between share return and firm size. However, this contradicts the developed market findings. There is also a significant positive relationship found between share return and positive earnings yield. The negative cash flow yield still has a negative significant relationship with the share return. In the pooled model, it is also evident that there is a significant positive effect of leverage on share return, which is similar to the findings in developed markets.

Table 3. Results of average cross-section and Pooled model (Panel A: 1988–1997).

ETA	SIZE	PBV	DIVY	VOL	EPPOS	EPNEG	CFPOS	CFNEG	LEVER	GROW	IDUM2	IDUM3	IDUM4	IDUM5
( <i>t</i> )	( <i>t</i> )	( <i>t</i> )	( <i>t</i> )	( <i>t</i> )	( <i>t</i> )	( <i>t</i> )	( <i>t</i> )	( <i>t</i> )	( <i>t</i> )	( <i>t</i> )	( <i>t</i> )	( <i>t</i> )	( <i>t</i> )	( <i>t</i> )
1.24**	0.19**	0.14**	-0.12**	0.24**	0.092	0.009	-0.013	-0.097°	0.049	0.029	0.134*	0.069	0.104°	0.028
(3.5)	(2.7)	(2.7)	(-2.6)	(4.5)	(1.5)	(0.139)	(-0.222)	(1.6)	(1.0)	(0.666)	(2.21)	(1.13)	(1.78)	(0.498)
Adjusted R <sup>2</sup> — 0.075, DW — 2.448														
1.11**	0.098**	0.011	-0.05	0.052	0.061°	-0.005	-0.039	-0.096*	0.055°	0.012	0.107*	0.052	0.068°	0.070°
(3.1)	(2.6)	(0.30)	(-1.5)	(1.1)	(1.69)	(-0.107)	(-0.983)	(-2.19)	(1.65)	(0.393)	(2.55)	(1.24)	(1.7)	1.84
Adjusted R <sup>2</sup> — 0.569, DW — 2.291														

Note: Log of share return; \*\* denotes significant at 1% level; ° denotes significant at 10% level.

In addition, like the average-cross sectional model, the pooled regression model also confirms that there is a significant industry influence on share return. The results state that there is a significant positive effect of industry dummy on share return for the Engineering sector, the Pharmaceuticals and Chemicals sector and the miscellaneous sector.

As noted before, the sub-sample period analyses (Table 4) are divided into two panels. Panel B covers the first five years of the full sample period including the period from 1988 to 1992, and Panel C covers the last five years including the period from 1993 to 1997. The results from average cross-section and pooled models for the first five years in Panel B support that there is a positive significant relationship between share return and price-to-book value and also show that there is a negative significant relationship between share return and negative cash flow yield. On the other hand, the results of the average cross-sectional regression model in Panel C, during the last five years period show that there is a significant negative relationship between share return and beta. A significant positive relationship is found between share return and other explanatory variables such as size, ratio of price-to-book value and volume of shares traded. Consistent with the findings in Panel A, the dividend yield in Panel C also has a negative effect on share return. In addition, industry dummies also have a significant positive effect on share return for the Engineering and Pharmaceuticals and Chemicals sectors. The pooled regression in Panel C also shows that there is a significant time effect on the relationship among the variables and there is a negative significant relationship between share return and beta. The relationship between size and share return is still positive and significant at 1% level. Furthermore, the analysis shows that there is a negative significant relationship between share return and dividend yield. The influence of industry dummy on the Engineering, Pharmaceuticals and Chemicals sectors is also found positively related with the share return. On the whole, it is seen that the second sub-period analyses are more consistent with the full sample period.

There are two probable econometric problems in the analysis; one is the problem of heteroskedasticity and the other is multicollinearity. We have run OLS multiple and simple regression models, which assume homokedastic distribution. However, the study has considered several measures to get rid of those problems. First, the variables that have been used are either transformed into logarithmic form or taken as deflated values, which reveal approximately normal distribution. Second, both Ramsey (1969) and White (1980) heteroskedasticity tests have been run to examine whether the

Table 4. Results sub-period analysis [Panel B: (1988–1992) and Panel C: (1993–19978)].

Variable	BETA	SIZE	PBV	DIVY	VOL	EPPOS	EPNEG	CFPOS	CFNEG	LEVER	GROW	IDUM2	IDUM3	IDUM4	IDUM5	
	(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	
Intercept	0.0063	-0.084	-0.062	0.166°	0.042	-0.029	0.047	0.128	-0.076	-0.295*	0.058	-0.050	0.041	0.132	0.090	0.103
	(0.664)	(-0.979)	(-0.61)	(1.82)	(0.427)	(-0.31)	(0.409)	(0.990)	(-0.662)	(-2.18)	(0.663)	(-0.602)	(0.346)	(1.1)	(0.824)	(0.928)
R <sup>2</sup> , Adjusted R <sup>2</sup>	— 0.040, DW — 2.16															
Intercept	0.0005	-0.072	-0.062	0.174°	0.070	0.021	0.037	0.106	-0.077	-0.30*	0.061	-0.042	0.045	0.149	0.110	0.099
	(0.553)	(-0.687)	(-0.62)	(1.89)	(0.709)	(0.217)	(0.320)	(0.824)	(-0.675)	(-2.18)	(0.701)	(-0.499)	(0.386)	(1.26)	(1.005)	(0.900)
R <sup>2</sup> , Adjusted R <sup>2</sup>	— 0.069, DW — 2.16															
Intercept	0.0058	-0.316**	0.244**	0.145*	-0.155**	0.283**	0.104	-0.002	-0.009	-0.042	0.024	0.029	0.190*	0.910	0.126°	0.005
	(1.16)	(-5.22)	(3.58)	(2.28)	(-2.63)	(4.17)	(1.38)	(-0.024)	(-0.117)	(-0.596)	(0.396)	(0.532)	(2.61)	(0.910)	(1.796)	(0.079)
R <sup>2</sup> , Adjusted R <sup>2</sup>	— 0.099, DW — 2.57															
Intercept	0.0073	-0.163**	0.142**	0.013	-0.063°	0.060	0.069	-0.038	-0.042	-0.046	0.047	0.014	0.150**	0.035	0.082°	0.064
	(0.24)	(-3.76)	(3.15)	(0.302)	(-1.62)	(1.29)	(1.33)	(-0.784)	(-0.856)	(-0.974)	(1.14)	(0.396)	(3.116)	(0.726)	(1.76)	(1.43)
R <sup>2</sup> , Adjusted R <sup>2</sup>	— 0.612, DW — 2.28															

° Variable: Log of share return; \*\* denotes significant at 1% level; \* denotes significant at 5% level. ° denotes significant at 10% level.

Table 5. Measures of assessing multicollinearity and their thresholds.

Measures	Thresholds (No sign of Multicollinearity)	Sign of Multicollinearity	Diagnostic Checking of the Analysis in this Study
Correlation Matrix (Pearson correlation $r$ )	$R < 0.90$	High correlation ( $r \geq 0.90$ )	$r = 0.64$ (highest)
Tolerance value (TOL)	$1/1 - R^2 > 0.10$	Below 0.10	TOL $> 0.10$
Variance inflated factor (VIF)	$1 - R^2 < 10$	Above 10	VIF $> 3$
Condition Index (CI)	CI $< 30$	Above 30	CI $< 21$
Proportion of Variance (regression coefficient Variance-decomposition matrix $r$ )	$R < 0.90$	Above 0.90	$r < 0.90$ for all of the independent variables
Durbin-Watson test ( $d$ )	$1.50 < d < 2.20$	D $< 1.50$ or $d > 2.20$	DW $< 2.20$ in all cases

Adapted from Mendenhall and Sincich (1989); Hair *et al.* (1995); Bryman and Cramer (1997); Freund and Wilson (1998).

regressions on the residuals are significant. Neither of the tests reject the null hypothesis that the errors are homokedastic. Third, as the empirical analysis deals with a number of multiple regression models, we have tested the multicollinearity problems in the model. The details of multicollinearity diagnosis statistics to examine the multicollinearity problems using SPSS programs have been presented in Table 5. To diagnose the multicollinearity problem in the multiple regression models, we have selected some values (SPSS diagnosis test) that have been illustrated in the Table 5. None of them reveal the existence of a multicollinearity problem in the model.

The adjusted  $R^2$  values for the average cross-sectional regression model are very low. These values indicate that despite the statistically significant relationship between share return and other explanatory variables, in an economic sense, these variables can explain only 7.05% variation of annual average share return variation of individual security. The adjusted  $R^2$  for the US market as found by Kothari *et al.* (1995) ranges from 0.07 to 0.44. Similarly, Bradley and Alles (1999) found 0.04 in the Australian market and Bryant and Eleswrapu (1997) reported 0.03 in the New Zealand market. In emerging market research, the low  $R^2$  values are common. For instance, Claessens *et al.* (1996) found  $R^2$  values which vary in different markets such as (-) 0.02 in Venezuela, 0.08 in Taiwan, 0.10 for Portugal and 0.16

for India. The low values might be due to the individual stocks instead of portfolios, which is mostly used by the US studies to minimize the interaction effect among the variables. In addition, the lower explanatory power of all the factors implies that country-specific factors such as political risks and economic risks may have a strong influence on share returns on the exchange. Hence, in emerging markets, returns are more likely to be influenced by local information than developed markets. However, when we considered the time effect, the adjusted  $R^2$  increases to 56.9% for the full period and 61.2% for the last sample period in fully specified models that explain more about the variation of share return. Nevertheless, given the nature of small sample size and to get portfolio free of formation bias (data snooping problems cited by Lo and Mackinlay, 1990), we are more interested in examining the factors which have a significant influence on the variation of share return of individual firms rather than portfolios.

The overall empirical findings document that the relationship between beta and share return is negatively significant but not stable across the sub-period. It is insignificant in the first five years of analysis. These findings are consistent with the contemporaneous findings of Fama and French (1992) in US market but inconsistent with the earlier findings of Black *et al.* (1972) and Fama and Macbeth (1973). However, the findings are quite consistent with the findings of Claessens *et al.* (1996), which show that only nine out of nineteen country coefficients on beta are significant. They find negative significant relationship between beta and share return in Malaysia and Pakistan. They also find that there are negative signs but insignificant beta in Chile, India, Indonesia, Portugal, Thailand, Venezuela and Zimbabwe. The negative beta is also found in developed market research (e.g., Chan and Chui, 1996; Bryant and Eleswarapu, 1997 and Bradley and Alles, 1999). Among these, research by Chan and Chui (1996) show evidence of negative beta effect in the UK market and explain that the relationship might be due to the impact of high inflation during the period of study. Hence, the negative beta effect is not unlikely on the DSE of Bangladesh market where economic uncertainty and political instability are common.

Further, the study shows a significant influence of other factors in addition to beta in explaining the variation of share returns on the DSE. Among them, it is confirmed that there is a positive significant relationship between share return and size on the DSE. The result is in contrast with developed markets but is similar to the findings of emerging markets. For example, Claessens *et al.* (1996) document a positive significant relationship between share return and size.

The present study documents that price-to-book value has a significant positive effect on share return. The finding is inconsistent with the findings of Fama and French (1992) in the US market and that of Chan *et al.* (1991) in Japanese markets, but is consistent with the findings of Claessens *et al.* (1996).

Volume is found as one of the significant variables in this study and it is positive in all the cases. The findings are consistent with the findings of other emerging markets as shown by Claessens *et al.* (1996).

The positive earnings yield, which is positively significant on share return during the whole sample period, is similar to the findings of developed markets (Basu, 1977, 1983; Chan *et al.*, 1991 and Fama and French, 1992). It is also supported by the findings of Claessens *et al.* (1996) who find a significant influence of positive EP ratios in seven countries, with six of them being positive (e.g., Chile, Greece, Korea, Mexico, Pakistan and Philippines).

Dividend yield also has a significant influence on share return in the whole sample period. A significant negative relationship is found between share return and dividend yield on the DSE. The findings are not unexpected because Christie and Haung (1994) scrutinise US dividends and find that the patterns of dividend change over time, sometimes positive and at other times negative. Similarly, Litzenberger and Ramaswamy (1979) developed a model, which allows the coefficients to be either positive or negative. Moreover, Claessens *et al.* (1996) find evidence of significant positive dividend yield effect in Jordan, Nigeria and Turkey and at the same time find negative significant relationship in Brazil, Chile, Colombia, Korea and Thailand.

## 5. Summary and Conclusions

There is evidence of many factors in addition to beta being priced in the cross-section of stock returns. These have typically been referred to as anomalous pricing effects due to lack of acceptable theoretical justification for their inclusion in pricing models (Bryant and Eleswarapu, 1997). The findings of the empirical analyses of the general determinants of share returns on the DSE of Bangladesh also support that there are some anomalous pricing effects in addition to beta. It is interesting to know that the direction of relationship is not always consistent with the developed market research and the CAPM theory. However, the results are generally consistent with previous studies of emerging markets.<sup>1</sup>

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<sup>1</sup>For example, a World Bank study by Claessens *et al.* (1996) in 19 emerging markets including most of the Asian markets except Bangladesh.



The overall findings suggest that there are some anomalous factors that influence share returns on the DSE of Bangladesh. During the full sample period in fully specified models, the major determinants were the beta, size, the ratio of price-to-book value, volume of shares traded, earnings yield, cash flow yield, dividend yield and leverage. In addition, the study found a significant positive influence of industry dummies for the Engineering, Pharmaceuticals and Chemical, and Miscellaneous sectors.

The results of this study should be interpreted as either supporting or refuting the CAPM since we are restricted to making observations about the mean variance efficiency of the available share market indices (see, for example, Roll, 1977 and Roll and Ross, 1992). We can, therefore, comment only on the usefulness of historically estimated coefficients and the explanatory power of the variables used. This study should provide useful information to practitioners in Bangladesh who use any or all of these variables in their decision-making process. The study also expands the general understanding of asset pricing in less developed markets.

### Acknowledgment

We would like to thank our Ph.D supervisor Professor Kevin Keasey, University of Leeds, UK, for his helpful comments on the earlier version of this paper.

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